

**ANGLER USE AND HARVEST SURVEYS ON SHERIDAN LAKE,
SOUTH DAKOTA, MAY - JUNE 2003 WITH SPECIAL
EMPHASIS ON STOCKING MCCONAUGHY STRAIN
CATCHABLE RAINBOW TROUT**

**South Dakota
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Game, Fish and Parks
Wildlife Division
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Pierre, South Dakota 57501-3182**

**Completion Report
No. 04-07**

**Angler Use and Harvest Surveys on Sheridan Lake, South Dakota, May-
June 2003 with Special Emphasis on Stocking McConaughy Strain
Catchable Rainbow Trout**

By

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Completion Report

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PREFACE

The data and summaries presented in this report were collected in 2003. Copies of this report and references to the data can be made with permission from the authors or the Director of the Division of Wildlife, South Dakota Department of Game, Fish and Parks, 523 E. Capitol, Pierre, South Dakota, 57501-3182.

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EXECUTIVE SUMMARY

This report includes angler use and harvest data from April - June 2003 for Sheridan Lake, South Dakota. These surveys are a major instrument used in the decision making process for managing Black Hills reservoirs. The survey was initiated to determine angler harvest and catch of various species of fish. Catchable rainbow trout were stocked for the first time since 1996 into Sheridan Lake and were among the fish species present. Poor returns of trout to the angling public from the previous fingerling stockings led to the decision to not stock trout in Sheridan Lake. An attempt was made in early 2003 to reinstate trout stocking in Sheridan Lake using catchable size fish.

Four objectives were set forth by the Black Hills Fish Management Team to determine the effectiveness of the 2003 catchable rainbow trout stocking. The objectives were:

Objective 1. Improve angler satisfaction at Sheridan Lake so as to equal or exceed the 1999 South Dakota State Average of 73.4% by July 2004.

Objective 2. Increase average estimated monthly fishing pressure to 5,000 angling trips per month in May and June.

Objective 3. A 25 percent harvest of catchable size rainbow trout within 3 months of stocking.

Objective 4. Total angler catch will equal or exceed 10,000 rainbow trout from April through June.

Results from this angler use and creel survey indicated that three of the four objectives were met. During 2003, angler's responded with a satisfaction level of 75%, harvested 38% of the stocked trout and caught 13,206 (66%) of hatchery produced catchable rainbow trout. The one objective that was not met involved the number of fishing trips in the months of May and June (6,231). Anecdotal information confirms the presence of the remaining trout throughout the summer months.

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INTRODUCTION

Sheridan Lake (Pennington County) is a 385 acres (155.8 hectares) reservoir and one of the few in western South Dakota that fill the niche for anglers pursuing fish by boat, shore or through the ice (Figure 1).

The primary impetus for performing a creel survey in 2003 on Sheridan Lake was to determine the effect of stocking rainbow trout after an eight-year hiatus. Historically, trout were stocked into Sheridan Lake for the angling public. Yet starting in the 1960's other species of cool and warm water fish were found in the lake (Ford 1972). This change in fish faunal trend was thought to have a negative impact on the trout fishery. From a management perspective the change in the lake's fish species composition, either through increased competition or predation, required stocking trout at larger sizes with a corresponding increase in hatchery costs (Ford 1983). Finally, during a creel survey in 1994-1995, data showed a return of only 14% of stocked trout to the angler, which is far below the stated goal of 35% from fingerling trout stockings. The outcome from these results was that in 1995 stocking of trout was discontinued in Sheridan Lake.

Since 1995, the emphasis on fishing at Sheridan Lake has also changed. Angling switched from trout to the cool and warmwater species. Yellow perch, the third most sought fish in South Dakota, are prevalent and are known to have been in the lake since the 1960's (Stone 1996, Ford 1972). The perch have been a large part of the harvest from Sheridan Lake, especially during the ice fishing months. At times a strong year class of black crappie has been seen in the lake and provides some angling opportunity (Meester 1996). One of the more recent additions to the species composition at Sheridan Lake has been northern pike. The pike are able to reproduce in Sheridan Lake, and the population replenishes itself (Meester 1996). However, northern pike are traditionally susceptible to anglers and the average size of the fish in the lake may have diminished. Overall, the various species introductions in Sheridan Lake appear to have had deleterious effects on the trout fishery.

Six different fishery management techniques were described by Erickson (1997) to address the problem of low fingerling trout survival in Sheridan Lake. Chemical renovation, change in management species, predator species introduction, removal of large predatory fish, and increasing the stocking size of trout were all considered. The option of stocking larger trout was dismissed at that time due to ineffectiveness of stocking larger trout in lakes with large predatory fish. Since that time, management biologists thought that anglers' attention towards harvesting larger northern pike has increased, and the numbers of large northern pike appear to have decreased. This information has been substantiated through lake survey and winter ice fishing tournament reports (unpublished data).

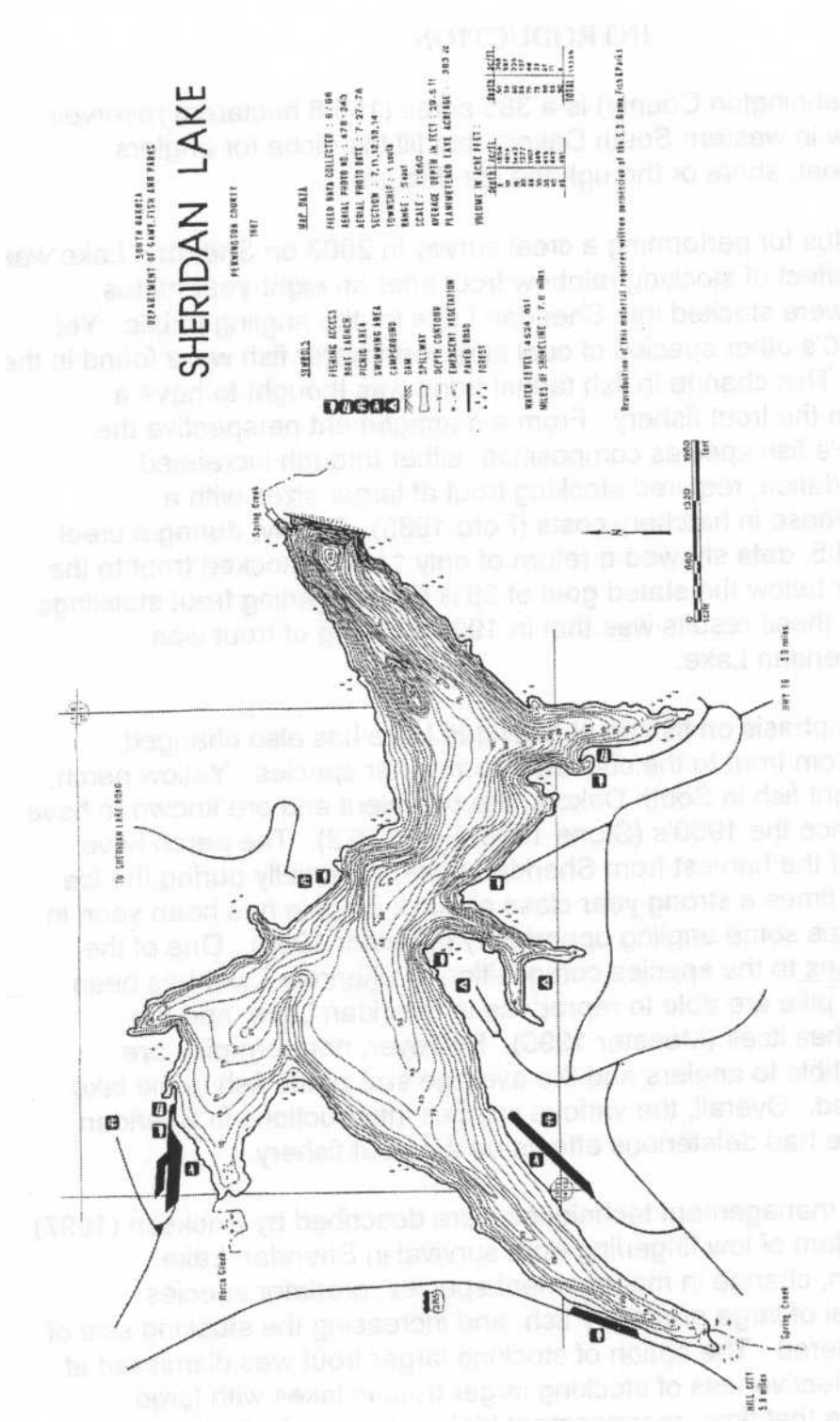


Figure 1. Lake Profile Map with bottom contours of Sheridan Lake, Pennington County.

A creel survey was conducted April - June, 2003 with the primary objective to determine changes in angler satisfaction, use, catch and harvest. The return of stocking trout as a management tool, in this case catchable McConaughy trout, was also a primary factor for proceeding with the creel survey.

Goals of Stocking Trout in Sheridan Lake

In February of 2003, goals and strategies were set in place to determine the success of the catchable wild strain stocking program starting in Sheridan Lake. This roving creel survey was the prime instrument for evaluating this management scheme in Sheridan Lake. The objectives of this management effort are stated below.

Objective 1. Improve angler satisfaction at Sheridan Lake so as to equal or exceed the 1999 South Dakota State Average of 73.4% by July 2004.

Objective 2. Increase average estimated monthly fishing pressure to 5,000 angling trips per month in May and June.

Objective 3. Achieve a 25 percent harvest of catchable size rainbow trout within 3 months of stocking.

Objective 4. Total angler catch will equal or exceed 10,000 rainbow trout from April through June.

SAMPLING METHODS

Angler Use and Sport Fish Survey

An angler use and preference survey was conducted from April through June, 2003. This survey comprised two independent parts: instantaneous pressure counts along a route along the lake and angler interviews conducted between pressure counts. Each shift consisted of two randomly picked pressure counts. Interviews were only conducted with those anglers who had completed their fishing trip. Angler interviews provided information on trip length, species caught, numbers of fish caught and released, angling method and angler satisfaction.

A stratified random creel survey was used. Creel Days were divided into two strata: 1) weekend/holiday and 2) weekdays. One weekday and one weekend-day were sampled each week. To this extent, favor was placed on weekend anglers as it was felt that most interviews would occur at this time. Days were stratified by AM and PM shifts. For each month, half of all shifts were randomly assigned to be conducted in the AM and half were conducted in the PM during daylight hours.

During the 2003 creel survey (April-June), each angler was asked the following question: "Considering all factors, how satisfied are you with today's fishing trip?" The respondents were given their choice of five different responses: Very satisfied, Moderately Satisfied, Neutral, Moderately Dissatisfied and Very Dissatisfied. This question was asked during a prior creel survey at Sheridan Lake. A second question asked of fishermen was "Did the presence of rainbow trout attract you to fish here today?" and their response was either yes or no.

All information was analyzed by the South Dakota Department of Game, Fish and Parks entered into Creel Application Software (CAS) Creel Survey Data Entry/Analysis Program.

RESULTS & DISCUSSION

Angler Satisfaction

Satisfaction of Anglers during the 2003 Creel Survey

In response to satisfaction, 48% of the anglers responded as very satisfied, with 27% moderately satisfied and 20% neutral. Only 5% were moderately dissatisfied or extremely dissatisfied. For comparisons with statewide averages groupings were grouped into three main categories: satisfied, neutral and dissatisfied. In these groupings the responses yielded: satisfied (75%), neutral (20%), and dissatisfied (5%) (Table 1).

Table 1. Summary report for preference question responses totaled over entire creel survey (April-June, 2003) on Sheridan Lake.

Answer Description	Count	Percent of Total
Very Satisfied	178	48.37
Moderately Satisfied	100	27.17
Neutral	73	19.84
Moderately Dissatisfied	13	3.53
Very Dissatisfied	4	1.09

Historical Perspective on Angler Satisfaction

Early creel information on Sheridan Lake did not state the presence of angler satisfaction (Stewart 1964, Ford 1972). The reason for this is that a human dimension was not a common attribute normally examined until recently. Angler satisfaction on Sheridan Lake was at an all time low (39.4%) during the last creel survey in 1999-2000 (non published field data, 2000; Figure 2). Reports from a

creel survey just five years earlier (1994-1995) indicated angler satisfaction at 57.1 % (non published field data, 1995). The drop in the satisfaction level from this five year period may be attributed to the elimination of stocking trout in the lake, that the U.S. Forest Service now charges to gain admission to many parts of the lake, or other factors.

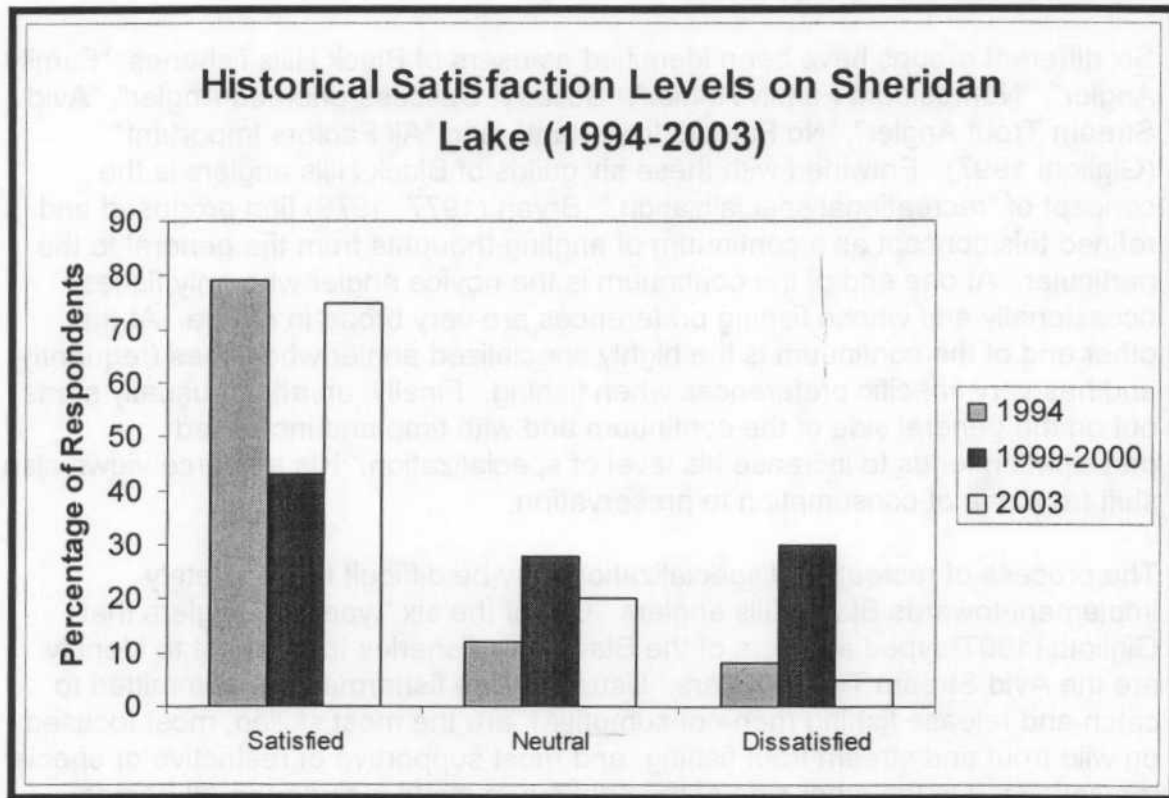


Figure 2. Recent Historical levels of Satisfaction by Angler's using Sheridan Lake, 1994-2003.

Management of a fishery is a combination of the fishery and human dimension aspects. The fishery component includes such items as age, fish growth, fish species composition/relative abundance, food habits, etc., and is usually studied by fisheries personnel. In regards to human dimensions, angler satisfaction is one of the primary measurements of the user group. Many different attempts have been made to determine angler satisfaction. In the State of New Mexico, for example, angler satisfaction has been recorded as the number of angler days per year (Anonymous 2003). Although this would provide some long-term trends the major fault with this type of system is the assumption of constant levels of benefits per fisherman regardless of success or quality (Hendee 1974). Other studies have shown that fishing entails more than just catching fish. For some

anglers being successful in catching fish can still yield an unsatisfactory experience, especially if the non-catch aspects of the angling trip are considered by them to be of poor quality. Conversely, some anglers might not catch any fish, yet be satisfied with their angling experience. Non-fishing aspects affecting satisfaction may include the weather, fishing experience, disturbances or other factors. Overall, it is important to determine angler's wants and their wishes regarding their fishing experience.

Six different groups have been identified as users of Black Hills fisheries: "Family Angler", "Nonresident Family Angler", "Solitary, Success-oriented Angler", "Avid Stream Trout Angler", "No Factors Important", and "All Factors Important" (Gigliotti 1997). Entwined with these six guilds of Black Hills anglers is the concept of "recreational specialization." Bryan (1977, 1979) first proposed and refined this concept as a continuum of angling thoughts from the general to the particular. At one end of the continuum is the novice angler who only fishes occasionally and whose fishing preferences are very broad in nature. At the other end of the continuum is the highly specialized angler who fishes frequently and has very specific preferences when fishing. Finally, an angler usually starts out on the general side of the continuum and with time and increased participation tends to increase his level of specialization. His resource views also shift from one of consumption to preservation.

The process of recreational specialization may be difficult to completely implement towards Black Hills anglers. Out of the six "types" of anglers that Gigliotti (1997) typed as users of the Black Hills fisheries the easiest to identify are the Avid Stream Trout Anglers. Usually these fishermen are committed to catch and release fishing (non-consumptive), are the most skilled, most focused on wild trout and stream trout fishing, and most supportive of restrictive or special regulations. On the other side of the continuum might include the All Factors Important group who identified fish species, past success, presence of large fish, and eating fish as qualities they sought when selecting a fishing site. The other fishing groups would likely be spread across the continuum; however, the Solitary Success-Oriented anglers may be oriented near the All Factors Important group. All of this information simply indicates that there is no such thing as an "average" angler in the Black Hills. This is not a new idea; McFadden (1969) first proposed that there are actually a number of subgroups of angling types and not simply an average angler. The problem being with the definition of an "average angler" is that they pursue different sources of satisfaction from the fishery resource (Bryan 1982). In theory, knowledge of the multiple angling types would allow fisheries managers to regulate fisheries in ways that optimize angler satisfaction. For managers of the Black Hills fisheries, satisfying each of the six groups may be problematic. Past experience has shown a variety of angler wants and wishes at Sheridan Lake.

A historical example of conflicts in the Black Hills fisheries occurred in 1965, when night anglers were blamed for depleting the large trout in some lakes. This issue escalated and eventually the State Legislature passed a law in 1970 making it unlawful to fish in Sheridan, Pactola, and Deerfield lakes between the hours of 11 pm and 4 am. This law was repealed by the State Legislature in 1979.

Angling Pressure

Angling Pressure during the 2003 Creel Survey

The calculated number of angling hours for the months of May and June in 2003 was 6,231. This represents only a slight increase over the 1999-2000 survey (6,089 trips) and fell below the goal of 5,000 in May and June. In spite of this, a impressive change occurred during the month of May where over 2,600 angling hours were gained from the previous creel survey (Table 2).

Historical Perspective on Angling Pressure

During the 1999-2000 creel survey, angling on Sheridan Lake consisted of two heavy periods of fishing pressure (Table 2 and Figure 3). The heaviest pressure occurred during the summer months (July), with another period of high pressure during winter ice-fishing (January - February). Throughout the summer months there were at least 2,000 anglers. There was a surprisingly low amount of pressure in May (707 hours), yet pressure jumped to over 8,000 hours by the month of June. The winter ice fishing period showed at least 1,500 people using the resource. The months between the two periods received very little pressure. March was the slowest month for fishing in 2000, with only 73 fish estimated as being caught. As recorded by two creel surveys, fishing pressure during the month of May decreased by nearly an estimated three-thousand eight hundred anglers in just six years from 9,800 in 1994 to 6,089 anglers in 1999-2000 (Table 2).

Table 2. Overall pressure and catch rates from Sheridan Lake during the month of May (1994, 2000, 2003).

Year	Angling Pressure (hours)
1994	9,800
1999-2000	6,089
2003	8,626

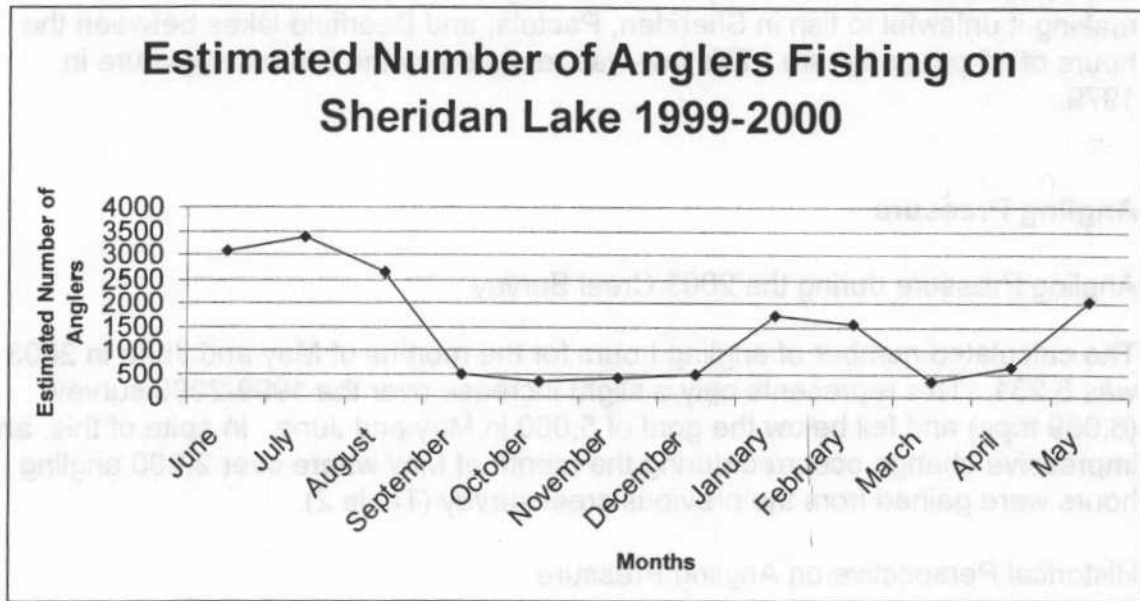


Figure 3. Estimated number of anglers fishing at Sheridan Lake during June 1999 to May 2000.

Angling Harvest

The term "harvest" of fish is used by fisheries biologists to indicate those anglers who specifically keep their catch. It differs from the term "catch" as this simply refers to all fish caught and may include some fish returned to the fishery.

Unlike their natural counterparts, hatchery rainbow trout are a produced commodity. As such, there are expectations of the "reasonable" return of this product. Harvest of trout in the Black Hills has been a measurement of this return for some time.

Historical Perspective on Angling Harvest

The 1984 Black Hills Trout Management Plan goal for the harvest of trout in the Black Hills is 75% for catchable trout and 35% for fingerling trout. These values were originally placed on Black Hills lakes by the USFWS while they were running what is now known as the McNenny State Fish Hatchery (Larry Ferber, pers. comm.). Two potential flaws in these levels of return are that they lack sensitivity in today's situations when a mixed species of fish exist in lakes, and

they don't address differences in survival between stream and lake environments. Despite the apparent flaws in the current system, the Department of Game, Fish and Parks still have these levels for measurable goals.

During the creel survey of 1994, almost 9,500 rainbow trout were harvested from April through June (unpublished data). Stocking of trout was discontinued at Sheridan Lake soon after the 1994 survey and trout were nearly eliminated in the lake. Because Sheridan Lake has a diverse fishery and many predators, a return to the angler goal of 25% for the 2003 stocking was used, which is well below the management plan goal of 75%.

Harvest of fish from Sheridan Lake during the 2000 creel survey presented similar overall results as the angling pressure (Figure 3). Fish harvest was highest during the summer months (May - August) and the winter ice fishing months (January and February) (Table 3).

Angling Harvest during the 2003 Creel Survey

Estimated rainbow trout harvest from April-June, 2003 was 7,641 fish, or 38% of the 20,147 rainbow trout stocked into the Sheridan Lake in late March (Table 4). This is well above the stated goal of 25% for this stocking. Of the total number of rainbow trout harvested during April-June the estimated numbers harvested each month were as follows: April - 1,716 (22% of total), May - 3,248 (42% of total), and June - 2,677 (35% of total). Obviously many anglers were willing to keep their catch of these larger stocked trout.

Angler Catch

Angler catch is referred to as the total number of fish caught (ie. Total fish harvested plus total fish released). Differences between harvest numbers and angler catch are due to some anglers only catching the fish and then releasing it. Catch and release angling may be fishing only for sport, catching an undesirable species or catching a fish that was too small. Regardless, catch allows managers to determine if, when, and how many times anglers catch an individual fish. The value of a particular fish increases with each "catch" as the fish provides enjoyment for more anglers. In the case of stocked trout, the value of released fish helps to increase their overall use, while keeping stocking costs static.

Table 3. Catch and harvest estimates by species during April 2000, May 2000 and June 1999 at Sheridan Lake, Pennington County.

Waterbody	209 Sheridan Lake												
Work Period	Totaled Over: 4, 5, 6 -- April, May, June												
Day Type	Totaled Over: 1,2,3 -- Weekend/Holiday, Weekday, Weekend/Holiday or Weekday (1 or 2)												
Zone	Totaled Over: 1 -- Sheridan Lake												
Type of Fishing	Totaled Over: 1,2,3 -- Boat, Shore, Ice												
Estimate Type	Species	N	Catch SE	80% CI	95% CI	N	Harvest SE	80% CI	95% CI	N	Release SE	80% CI	95% CI
All Anglers	Black bullhead	6,772.70	2,918.40	3,741.39	5,720.07	833.22	620.86	795.95	1,216.89	5,939.48	1,998.36	2,561.90	3,916.79
All Anglers	Northern pike	458.24	165.71	212.44	324.79	166.65	93.00	119.23	182.28	291.58	103.88	133.18	203.61
All Anglers	Rainbow trout	1,137.37	1,059.32	1,358.04	2,076.26	108.82	84.33	108.11	165.28	1,028.55	1,055.97	1,353.75	2,069.70
All Anglers	Brook trout	8.07	7.75	9.93	15.18	8.07	7.75	9.93	15.18	0.00	0.00	0.00	0.00
All Anglers	Rock bass	40,503.39	8,011.63	10,270.91	15,702.80	1,178.81	632.03	810.27	1,238.79	39,324.59	7,972.37	10,220.57	15,625.84
All Anglers	Green sunfish	218.94	163.13	209.13	319.73	0.00	0.00	0.00	0.00	218.94	163.13	209.13	319.73
All Anglers	Smallmouth bass	824.02	394.96	506.34	774.12	0.00	0.00	0.00	0.00	824.02	394.96	506.34	774.12
All Anglers	Largemouth bass	1,519.85	502.75	644.52	985.39	205.66	90.09	115.49	176.57	1,314.18	493.43	632.57	967.12
All Anglers	Black bass	11.98	10.64	13.65	20.86	0.00	0.00	0.00	0.00	11.98	10.64	13.65	20.86
All Anglers	Black crappie	34,578.77	9,943.72	12,747.85	19,489.69	18,575.09	5,761.76	7,386.58	11,293.06	16,003.68	5,379.72	6,896.80	10,544.25
All Anglers	Yellow perch	18,324.61	3,910.45	5,013.19	7,664.48	7,339.96	3,347.54	4,291.54	6,561.17	10,984.65	4,186.64	5,367.28	8,205.82
Overall		104,357.94	22,625.16	29,005.45	44,345.31	28,416.29	8,869.85	11,371.15	17,384.90	75,941.65	16,718.27	21,432.83	32,767.82

Table 4. Catch and harvest estimates by species during April - June, 2003 at Sheridan Lake, Pennington County.

Waterbody	209 Sheridan Lake												
Work Period	Totaled Over: 4, 5, 6 -- April, May, June												
Day Type	Totaled Over: 1,2,3 -- Weekend/Holiday, Weekday, Weekend/Holiday or Weekday (1 or 2)												
Zone	Totaled Over: I -- Sheridan Lake												
Type of Fishing	Totaled Over: 1,2,3 -- Boat, Shore, Tube												
Estimate Type	Species	N	Catch SE	80% CI	95% CI	N	Harvest SE	80% CI	95% CI	N	Release SE	80% CI	95% CI
All Anglers	Black bullhead	3,236.96	1,458.48	1,869.77	2,858.61	2,649.96	1,415.57	1,814.75	2,774.51	586.99	262.11	336.03	513.74
All Anglers	Northern pike	450.36	231.24	296.45	453.24	51.63	68.44	87.75	134.15	398.73	220.88	283.17	432.93
All Anglers	Rainbow trout	13,206.64	2,792.24	3,579.65	5,472.79	7,640.49	1,955.64	2,507.13	3,833.05	5,566.15	1,701.86	2,181.78	3,335.64
All Anglers	Rock bass	36,624.08	11,424.52	14,646.23	22,392.05	684.12	553.14	709.13	1,084.16	35,939.97	11,015.46	14,121.82	21,590.30
All Anglers	Smallmouth bass	1,287.14	1,233.32	1,581.12	2,417.31	0.00	0.00	0.00	0.00	1,287.14	1,233.32	1,581.12	2,417.31
All Anglers	Largemouth bass	168.64	83.35	106.86	163.37	40.15	25.46	32.64	49.90	128.49	79.37	101.75	155.57
All Anglers	Black crappie	6,613.37	3,750.24	4,807.81	7,350.48	2,600.64	1,434.01	1,838.40	2,810.66	4,012.73	3,290.48	4,218.39	6,449.34
All Anglers	Yellow perch	3,740.83	1,456.22	1,866.87	2,854.19	1,225.10	378.92	485.77	742.68	2,515.73	1,179.74	1,512.42	2,312.28
Overall		65,328.00	16,369.78	20,986.06	32,084.78	14,892.09	5,343.37	6,850.19	10,473.00	50,435.91	13,399.07	17,177.61	26,262.19

Table 5. Catch and harvest estimates for rainbow trout and all species totaled during April - June, 2003 at Sheridan Lake, Pennington County.

	Catch	Harvest	Release
April (All Species)	2,993	2,054	938
April (RBT only)	2,311	1,716	595
May (All Species)	37,275	6,378	30,897
May (RBT only)	7,698	3,248	4,450
June (All Species)	25,060	6,459	18,601
June (RBT only)	3,197	2,677	520
Sum of All Species	65,328	14,891	50,436
Sum of RBT only	13,206	7,641	5,565

Angling Harvest during the 2003 Creel Survey

In 1994, 9,485 rainbow trout were caught during April-June out of the 100,000 fingerling rainbow trout stocked. The stated goal by the Region 1 Fisheries Management Team for angler catch of the catchable McConaughy strain rainbow trout stocked into Sheridan Lake in 2003 was to equal or exceed 10,000 fish. The estimated number achieved during April-June, 2003 was 13,206. Not only was the goal of angler catch achieved, but it represented a return to the angler of 66% of the stocked fish. This high rate of return was also at a stocking rate of 1/3 the typical level for a lake of this acreage.

Historical Perspective on Angling Catch

As with other aspects of the fishery on Sheridan Lake, angling catch resembled those of angling pressure. Two specific highlights of this fishery are the increases in fishing from May-August and January-February. In 2000, 10,408 fish were caught in January alone. Other months that produced high catch rates of over 7,000 fish were February (2000) and June (1999). The lowest harvest of fish occurred during March and May where zero fish were measured by the creel clerk. This information may misrepresent what actually occurred, as May is a popular angling month throughout South Dakota. It seems improbable that no fish were caught during the entire month. The month of March is commonly a period where ice conditions are poor and represents a transition between ice and open water angling and the zero catch while unlikely may still be closer to reality.

Anecdotal Reports

One of the stated long-term methods of determining trout usage after the 2003 catchable stockings was anecdotal reports from conservation officers, anglers, and resort operators. Numerous reports from the local conservation officers indicate that anglers are continuing to fish for this latest stocking of trout, and they are even targeting them at night (pers. comm. Chad Sayles, WCO, Blair Waite, WCO). The practice of fishing at night on Sheridan Lake was an angling method back in the 1970's, but recently lost appeal with the elimination of trout

from this lake. Fishermen have also come into the Game, Fish and Parks Regional Office in Rapid City commenting about the stocking of trout in Sheridan Lake. Lastly, the resort operator has indicated that their business is "up" this year compared to last. No doubt the stocking of these catchable rainbow trout has had a great deal to do with this increase in business. Overall, the trout continue to be a utilized resource throughout the summer months with a positive impact on the localized fishermen and business owners.

Demographics

The relationship between state agencies and anglers is comparable to other service oriented businesses. Trust is important in the long-term relationship between a consumer and a business, and is essential to the survival of the business. A recent trend has been to increase openness between angler wants and expectations by fishery managers. One of the largest hurdles encountered by state departments is that anglers lose sight that managers are trying to do what is best for the fishery resources on a long term basis. Anglers are more inclined to observe items and want the results immediately.

One of the goals of state agencies is to provide a satisfying experience to the angler. In order to obtain this information creel or mail-out surveys are usually implemented in order to determine what motivates them to participate, what they spend, what they think about regulations or why they have stopped participating altogether.

Five different data items relating to demographics (gender, age, residency, boat vs. shore angling and species anglers are targeting) were gathered during the 2003 creel survey on Sheridan Lake. During the 2003 creel survey 266 individual fishermen were noted as being male (72%) and 101 were female (27%) (Table 7). During the 1999-2000 survey, results were even more slighted towards males as they represented 82% of the fishermen.

Reported ages of anglers fishing in 2003 were noted in five age groups (Table 8). The age groups segregated anglers as children, teenagers, young adults, middle aged adults and senior citizens. The largest age group noted fishing Sheridan Lake in 2003 were those fishermen ranging from 20-39 years of age. Anglers aged 40-59 were the second most prevalent group. Overall the data shows an almost perfect bell-shaped curve starting at the youngest and proceeding to the oldest age groups. Age groupings were not identified during the 1999-2000 creel survey so no long term trends or changes can be determined.

Table 6. Overall pressure and harvest rates from Sheridan Lake, June 1999 - May 2000.

Estimated pressure and harvest ALL SHIFTS COMBINED FOR 1999 and 2000							Total anglers	Total hours from	Total fish caught fro	Total hours	Fish/hour from interview	Estimated #fish caught
Month	count	interval	ave trip	# Days in month	# Days censused	Est. # of anglers	interviewed	interviews	interviews			
Jun	3,176	1	3.20	30	18	3,078	213	681.14	1,890	8,357	2.77	7,213
Jul	2,597	1	2.88	31	17	3,362	254	731.74	1,477	7,688	2.02	2,415
Aug	1,940	1	2.99	31	19	2,641	180	537.82	1,293	5,354	2.40	2,541
Sept	846	1	3.46	30	18	497	116	401.25	794	1,333	1.98	993
Oct	736	1	3.10	31	18	339	94	291	121	1,000	0.42	431
Nov	663	1	2.76	30	17	399	86	237	353	948	1.49	1,249
Dec	487	1	5.67	31	18	536	64	363	140	1,784	0.39	515
Jan	2,122	1	3.70	31	19	1,724	178	658	1071	6,286	1.63	10,408
Feb	1,880	1	2.70	29	16	1,572	112	303	564	4,050	1.86	7,228
Mar	320	1	2.37	31	20	327	50	118.33	0	707	0	0
Apr	751	1	2.24	30	23	613	90	201.16	36	1,290	0.18	810
May	3,538	1	3.74	31	22	2,020	164	612.67	0	7,011	0	0
Totals	19,056	1	3.21	366	225	17,108	1601	5,136.11	7,739	45,808	1.51	33,803

Summer months within the Black Hills region consistently have a large number of tourists. Therefore, home states of anglers were noted, and zip codes were identified, and travel distances estimated by the creel clerk. In spite of tourism, over 95 percent of anglers fishing Sheridan Lake from April-June, 2003 were South Dakota residents (Table 9). Eight other states, mostly from the plains or rocky mountain region, were identified by anglers as their home state. Almost eighty-eight percent of anglers fishing Sheridan Lake noted that they traveled 25 miles or less to reach the lake. Ninety-percent of the anglers interviewed identified themselves as having driven 50 miles or less to reach Sheridan Lake. It can easily be said that a "typical" fisherman at Sheridan Lake was a Black Hills resident.

Table 7. Residency of anglers on Sheridan Lake June 1, 1999 through May 31, 2000 and April-June, 2003.

	1999-2000	2003
Female	18%	28%
Male	82%	72%

Table 8. Estimated ages of anglers on Sheridan Lake April 1, 2003 through June 30, 2003.
N = 366

Age Code	Age Group	Count	Percent of Total
1	0-9	52	14.21
2	10-19	41	11.20
3	20-39	141	38.52
4	40-59	86	23.50
5	60+	46	12.57

Table 9. Home state residency of anglers on Sheridan Lake April 1, 2003 through June 30, 2003.

N = 344 residents, 16 nonresidents

6	Colorado	1	0.28	6.25
12	Idaho	2	0.56	12.50
13	Illinois	3	0.83	18.75
14	Indiana	2	0.56	12.50
16	Kansas	1	0.28	6.25
27	Nebraska	4	1.11	25.00
34	North Dakota	2	0.56	12.50
41	South Dakota	344	95.56	---
43	Texas	1	0.28	6.25

Table 10. Estimated number of shore and boat fishermen using Sheridan Lake in two creel surveys (1999-2000 and 2003).

	1999-2000		2003	
	Shore	Boat	Shore	Boat
April	722	554	1892	1066
May	3636	2452	4890	3735
June	3411	5388	2823	2569

Fifteen hundred eighty anglers were interviewed during the 1999-2000 creel survey on Sheridan Lake (unpublished field data). Of those interviewed nearly 91 percent (1,451) identified themselves as residents of the Black Hills area. From the remaining anglers, only twenty-two were considered residents of South Dakota. The final 105 anglers purchased non-resident licenses and most of these stated that fishing was a secondary reason for their travel to the Black Hills. Of these non-resident anglers they identified traveling an average of 738 miles and planned to stay over six days in the Black Hills.

One change observed at Sheridan Lake since the last creel survey has been the predominance of boat anglers to shore angling. In 1999-2000, anglers on Sheridan Lake were most likely to be fishing from a boat (Table 10). About an equal amount were observed fishing from on shore and on ice. Only six individuals were noted as fishing from float tubes during the entire creel survey. The change seen among anglers fishing in 2003 was that most were now fishing from shore. Ice was unsafe or completely gone during the spring 2003 creel survey; therefore, no ice fishermen were noted.

The species of fish anglers are targeting helps provide fishery managers with a sense of direction when determining management options on any given body of water. The noted species sought by Sheridan Lake anglers has changed in the past two creel surveys. In 1999-2000, anglers were most often targeting any species that would bite. In 2003, fishermen were targeting the newly stocked rainbow trout. Other fish species noted by anglers as their desired catch for the day were any species, black bullhead, black crappie, largemouth bass, northern pike and yellow perch. A large increase in the popularity of rainbow trout (presumably due to the stocking of catchable hatchery stock) was seen, but there was also a sharp decline in the previously most popular group, "any species." Other species that experienced a slight rise in popularity were black crappie and yellow perch. Most of the other information was the similar to that seen in 1999-2000.

Percent targeted species by anglers on Sheridan Lake in 1999-2000 and 2003

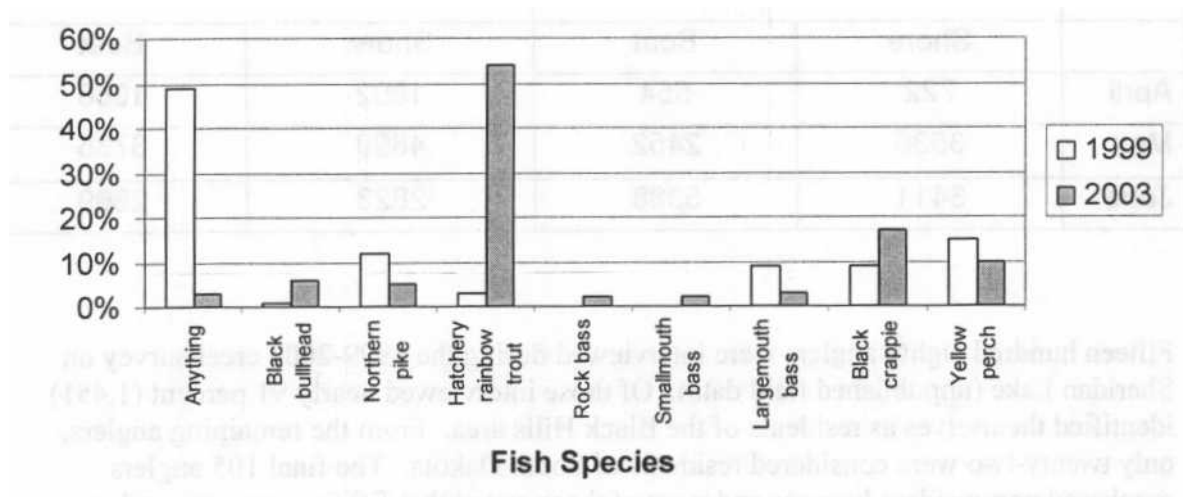


Figure 4. Percentages of fish species targeted by anglers on Sheridan Lake during 1999-2000 and 2003 from April - June.

Survival of Stocked Trout

There was concern about the survival of the stocked trout throughout the summer. To determine the survival of trout in Sheridan, a regular lake survey was performed in early July 2003 (unpublished field data). First, the lake survey demonstrated that, rainbow trout were still present in reasonable numbers in early July. Thirteen McConaughy strain rainbow trout were captured in gill nets, representing the third most common species captured (Appendix 3). These 13 rainbow trout represented almost 10 percent of the total catch from gill nets in 2003. The average length and weight of the collected rainbow trout was 313 mm (12.3 inches) and 304 grams (0.7 lbs) (unpublished field data). Reports from local Wildlife Conservation Officers confirmed the presence of trout and anglers targeting them into late summer (Chad Sayles, Pers. Comm.).

RECOMMENDATIONS

1. All four of the stated objectives put forth by the Regional Fisheries Management Team were either exceeded or approached during the creel survey of 2003. For this reason, spring stocking of McConaughy strain rainbow trout should continue in similar numbers as those stocked in March of 2003.
2. Stocking 10,000 McConaughy rainbow trout catchables in early October to provide trout during the ice fishing period. Historically, fall stocked rainbow trout have been highly valuable to the winter ice fishing.
3. Schedule future fisheries management survey work during mid-August. Survey work itself shall include gill netting, frame netting, day and night electroshocking. Efforts should be geared to the evaluation and survival of the catchable rainbow trout as well as other panfish and predatory species.
4. Schedule fall electrofishing surveys before fall rainbow trout stocking so as to limit the injury rate of trout.

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Appendix

Appendix 1. Creel Survey Interview Form used by creel clerks during the 2003 Sheridan Lake creel survey.

South Dakota Department of Game, Fish and Parks Sheridan Lake Creel Survey Interview Report

Form Interview- 01	
Interview ID	Office Space Only
Data Entry into Creel Database	
Date Entered/Initials	

Clerk Info	Water Body	Date			Time (Military)		Access Area	Creel Clerk	Refused Interview (X)	
		Mon	th	Day	2003	Arrival				Departure
Angler Info	Time (Military)		Interview w Time	Started Fishing	Stopped Fishing	Time Not Fished (Minutes)	Completed (X)	Type Of Fishing	Fish Species Sought	Party Size
	1	2								

Interview Continued (✓)	
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Angler	Gender	Age	Distance Traveled	Zip Code	State	Question Series	Question 1
1						0 1	
2						0 1	
3						0 1	
4						0 1	
5						0 1	

Series 01 Preference Questions:

- 2) Considering all factors, how satisfied are you with your fishing trip today?
- 01=Very satisfied
02=Moderately satisfied
03=Neutral
04=Moderately Dissatisfied
05=Very Dissatisfied
06=No Opinion

Series 02 Preference Questions:

- 1) Did the presence of rainbow trout attract you to fish here today?
- 08=Yes
09=No

Species	Number		
	Kept	Release	Illegal
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

Species	Length (mm)	Species	Length (mm)	Species	Length (mm)	Species	Length (mm)
1		11		21		31	
2		12		22		32	
3		13		23		33	
4		14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Comments:

Appendix 2. Creel Survey Pressure Form used by creel clerks during the 2003 Sheridan Lake creel survey.

South Dakota Department of Game, Fish and Parks
Sheridan Lake Creel Survey Fishing Pressure Report

Form Pressure/Aerial or Roving or Fixed	
Pressure ID	Office Space Only
Data Entry into Creel Database	
Date Entered/Initials	

	Date		2003	Survey Time (Military)		Access Area	Creel Clerk	Air Temp	Cloud Cover	Wind Speed	Wind Dir	Precip	Water Temp		Op Water (x)	Starting Location	Travel Direction
	Month	Day		Arrival	Departure												

Pressure Count #2

Water Body	Date		2003	Survey Time (Military)		Access Area	Creel Clerk	Air Temp	Cloud Cover	Wind Speed	Wind Dir	Precip	Water Temp		Op Water (x)	Starting Location	Travel Direction
	Month	Day		Arrival	Departure												

Type Of Fishing	Total	Running Tally
Fishing Boats		
Bank/Shore		

Pressure Count #3

Water Body	Date		2003	Survey Time (Military)		Access Area	Creel Clerk	Air Temp	Cloud Cover	Wind Speed	Wind Dir	Precip	Water Temp		Op Water (x)	Starting Location	Travel Direction
	Month	Day		Arrival	Departure												

Type Of Fishing	Total	Running Tally
Fishing Boats		
Bank/Shore		

Appendix 3. Table listing fish species sampled by night electroshocking, experimental gill net, and $\frac{3}{8}$ inch frame net at Sheridan Lake, 2003.

2003
 Sheridan
 Area = 1
 boat shocker (night)

Species	Total
Largemouth Bass	12
	12

std exp gill net

Species	Total
Black Bullhead	4
Brown Trout	1
Green Sunfish	1
Hatchery Rainbow Trout	13
Largemouth Bass	1
Northern Pike	2
Rock Bass	3
White Sucker	14
Yellow Perch	98
	137

std frame net ($\frac{3}{8}$ inch)

Species	Total
Black Bullhead	243
Black Crappie	1
Green Sunfish	4
Northern Pike	3
Rock Bass	186
Rudd	1
White Sucker	1
Yellow Perch	44
	483